

REMARKS

The Examiner pointed out the proper use of trademarks, and the specification text has been changed accordingly on page 3.

The Examiner rejected claimss 1-4, 6-14, and 16-20 under 35 U.S.C. 103(a) as being unpatentalbe over U.S. patent no. 4,821,146 ('146) to Behrens et al. in view of the COMPACTPCI short form specification. Claims 5 and 15 were rejected citing the same references together with a U.S. patent no. 6,265,914 ('914) to Randhawa.

The present invention amends claim (and similar amendment to claim 11) to distinguish the cited references by adding:

...is constructed to reduce the reflective wave path from the daughter card to the interposer card, thereby reducing the impedance mismatch and thereby allowing the noise to settle in time for the interposer card to output, in response to receiving a reflective wave, an incident wave...

No new matter is added as the problem of longer reflective wave path is described at the top of page 4, and the solution, found in the amended claims 1 and 11, is found in the first paragraph on page 4 of the original application. Especially see the sentence on page 4, line 17, "This is achieved by reducing the wave path defined by the bus traces so that the noise settles in time..." Later on page 7, line 11, begins a sentence "The present invention includes an interface bridge or interposer that addresses that difficulty. Specifically, the present invention includes an interface circuit that translates the

driver/receiver switching architecture associated with each daughter card into driver/receiver switching architecture that produces incident wave switching.” The difficulty is to provide incident waves switching in place of the reflective wave switching. That is the reflective wave switching of the daughter card is received by the interposer that outputs the incident wave to the backplane. In that way the reflective wave has a very short path length and the reflective wave settles very quickly, most times the reflective step (it looks like ringing) is masked within the rise and/or falls of the signal.

In order to evaluate the ‘146 (the Behrens patent), and not meant to belabor the point, a short review of the “reflective” and “incident” wave contrast may be helpful. As partially described at the top of page 4, “reflective” wave includes a doubling that returns. This doubling manifests itself as a step in the waveform. Explaining a little more fully, the cPCI technology “provide a series terminating resistor at the driver pin (not a stub terminating resistor at the connector).” See page 4, second column, about 2/3 down the column. The operation of a reflective driver is to provide a low impedance driver outputting say, 0V to +3V, directly into a 50 ohm resistor. The other end of the resistor is directly connected to a 50 ohm transmission line with a distal end that is open circuited (or a high impedance compared to 50 ohms). A +3V output from the driver is split between the 50 ohm resistor and the 50 ohm transmission line (the wave has not seen the end of the line yet). So there is a 1.5 volts level at the input to the transmission line. That 1.5 volt wave travels down the line hitting the open circuited end. There is a positive +1 reflection coefficient so a reflected 1.5V (the incident and reflected wave add to provide 3V at the end of the transmission line) is reflected back down the line. When the reflected wave hits

the beginning of the line there is the 50 ohm resistor which provides a line match and no more reflections would occur (the line is matched). The wave travels at about 2 nsec/ft (less than the speed of light which is about 1.5 nsec/ft). So, if the transmission line is about 21 inches long, the round trip for the wave travels about 3.5 feet or about 7 nsec. There will be a step of about 7 nsec in length, and receivers connected along the length of the line will see a step of something less than the 7 nsec. Also, since there are stub and mismatches along the line the step will appear as ringing or, the original application terms it "noise" in several places, see page 5, line 15/16. If a very fast edge, say of one nsec, occurs the ringing may be a severe problem. In the present invention, the interposer card receiver is only an inch or so away from the source of the reflective wave on the daughter card. Assuming the terminating resistor is still in place in the daughter card, the reflected step (twice the time length of 1 inch) will only be about 0.4 nsec. As such that will be masked by the one nsec rise time. This shortening of the reflected wave path provides a significant advantage for the present invention. The incident wave, with no series terminating resistor, drives the backplane directly, and to eliminate reflections the backplane wiring must be terminated. There are the 50 ohm terminations (12 and 13 of Figure 2) at either end of the backplane wiring.

In passing, the cPCI reflective wave approach provides a significant advantage, in that there is no DC current path via the open circuited transmission line, so there is no DC power consumed.

With the above in mind, on page 3 of the office action, at the end of the first paragraph, there is a statement with respect to the '146 patent that the "interposer card is de-

signed to convert reflective wave of the daughter card into incident wave switching at the slot connector. Respectfully, although the term “interposer card” is used, the ‘146 interposer card does not make such a conversion. To my reading there are no references to such a conversion, and the noise reduction of the ‘146 patent is not directly related to the use of “noise” in the present application regarding the reflective to incident wave conversion.

The ‘146 provides an interposer card that solves misalignment of cards, by using polarity techniques, and reduces noise by electromagnetic and electrostatic shielding. There is no suggestion of changing line terminations, etc., as explained above. The COMPACTPCI spec. does not help this aspect of the present claims. Moreover, the ‘914 pre-drivers also do not help.

The wording of the amendment is only to explain in more detail the reflective to incident conversion of original claims 1 and 11, and does not add any new limitation or any new matter, as explained above.

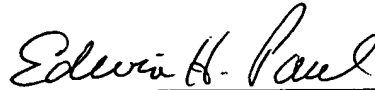
With the present amendment the claims are allowable of the cited art.

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112055-0059
17732-29190.00

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No. 03-1237.

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